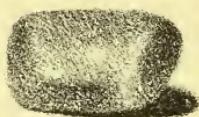
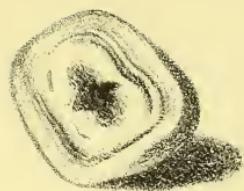
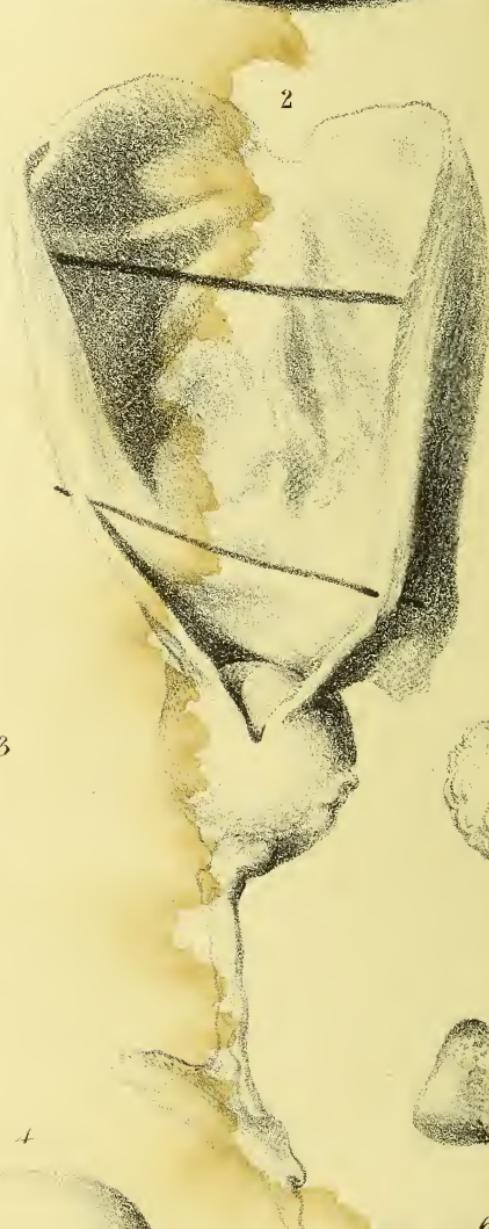


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ON THE MORBID CONDITIONS

OF THE

BILE AND GALL BLADDER,

BY

EDWARDS CRISP, M. D.

*Physician to the Metropolitan Dispensary.*

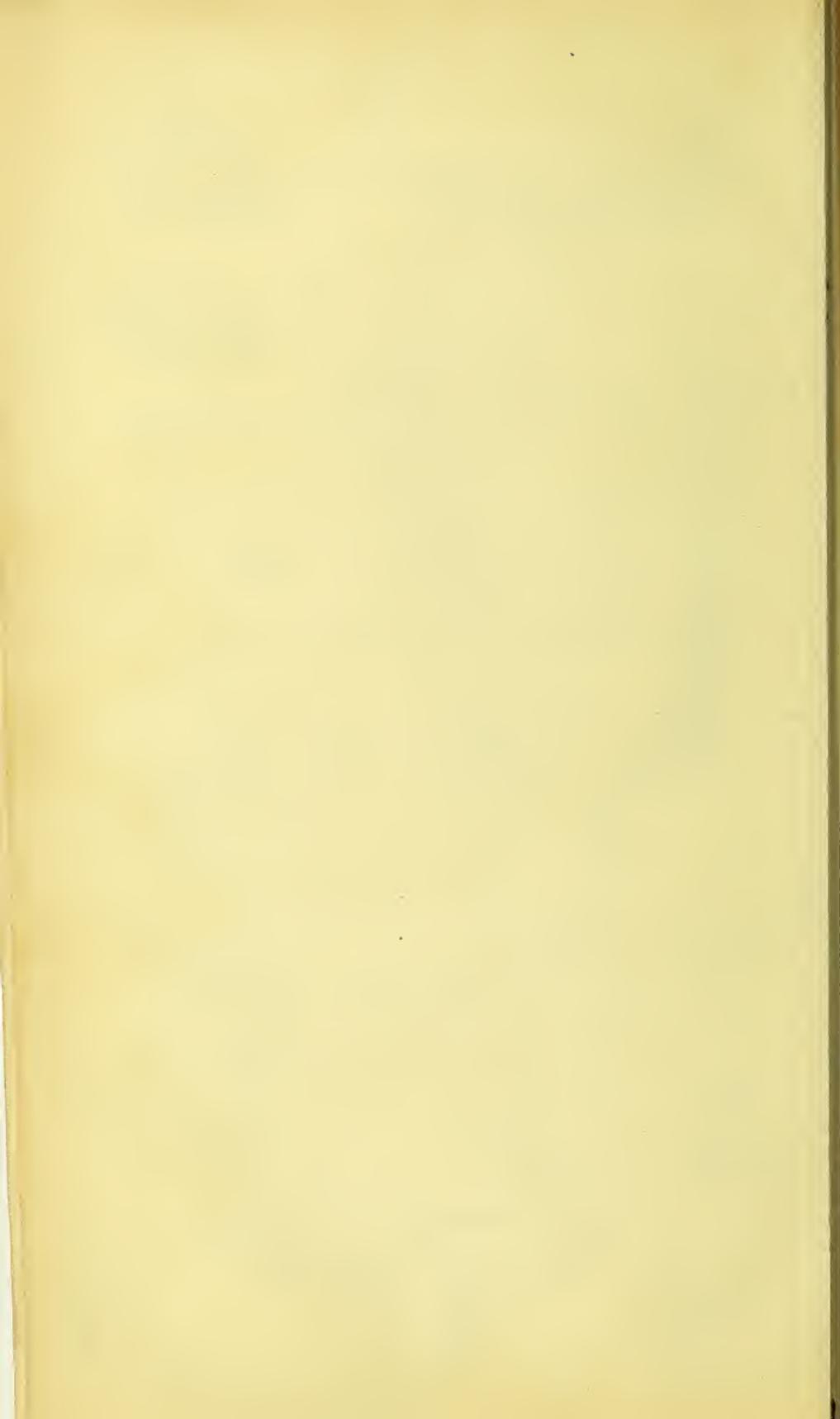
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1851.



## MORBID CONDITIONS OF THE BILE AND GALL-BLADDER.

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In November, 1841, I read a paper at the Medical Society of London on Gall-stones; and I endeavored to draw some practical inferences from a table of 112 cases. I had seen various, and very opposite opinions expressed by authors that I had consulted, and this induced me to attempt, by statistical deduction, to clear up some of the doubts that beset the subject. A period of ten years has elapsed since this paper was written, and I again venture to give the result of my experience by adding to my former essay, (recorded in the *Lancet*, December, 1841, which, with the exception of the table, I re-publish), such practical matter in relation to gall-stones, and other diseases of the bile and its reservoir, as I have since collected.

*Anatomy and physiology of the gall-bladder.* This receptacle for the bile, like the urinary bladder, consists of three coats, the muscular, (by some called areolar), being less distinct than in that viscus. The inner or mucous coat is formed into rugæ, with a minute network of vessels surrounding the follicles. These follicles secrete mucus which lubricates the lining membrane, and protects it from the acridity of the bilious fluid. The inner membrane varies in color according to the appearance of the bile. The peritoneum affords, usually, only a partial covering to the gall-bladder, but in some cases it entirely surrounds it. The cystic is the smallest of the three ducts, its average length being about an inch and a quarter; it is furnished, according to Soemmering, with from nine to twenty valves, and Cruveilhier says, he has seen from five to twelve. M. Amussat states, (*Rév. Méd.* 1847, p. 496), that the cystic duct possesses a spiral valve which has the double function of favoring the ascent of the bile, and of opposing its too rapid egress from the bladder. The hepatic duct is about the same length as the cystic, but the common duct extends to three inches. The two last are not furnished with valves. All these ducts are capable of great dilatation. From measurement I have ascertained that the gall-bladder of an adult holds about ten drachms of fluid, and that of a child fourteen months old, two drachms.

That the gall-bladder is a mere reservoir for the bile, is proved by the fact, that it has not unfrequently been found absent in the human subject. *Lancet* 1843, p. 649. Canton, *Ibid* 1847, p. 407. Partridge, *Provincial Journal* 1848, p. 710. Guy's Museum, p. 1952. Dublin, Richmond Hospital Museum, p. 962. Andral, *Clinique Méd.* Haller, *Lib. xxxiii. Sec. 2.* Cholmeley, *Medical Trans.*, vol. vi.

It is curious also in the lower animals, to observe the diversity that exists respecting the presence of the gall-bladder. Thus, to give a few examples of animals that have no gall-bladder:—horse, dromedary, elephant, alpaca, rhinoceros, bear, agouti, guinea-pig, rat, goat, deer, camel, porpoise, alligator, cuttlefish, ostrich, and parrot. But the following, as well as many other animals, are furnished with this receptacle:—ox, sheep, monkey, mole, otter, dog, lion, jackall, wolf, coatiundi, cormorant, ray, lamprey, perch, seal, rattlesnake, viper, and torpedo. Of three giraffes examined at the Zoological Gardens, two of them were without a gall-bladder, and the other had two gall bladders.

*Morbid anatomy of the gall-bladder.* I am not acquainted with any writer who has entered *fully* into the morbid anatomy of this viscus, or who has depended chiefly upon his own observations. In speaking of the preparations in different museums, I only allude to those which I have seen and examined myself.

*Dilatation.* Both the gall-bladder and its ducts have been found much enlarged; the former, generally from the long continued accumulation of bile; and the latter, from the passage of large calculi. In February, 1834, I saw an immense gall-bladder which was exhibited by Mr. Greville Jones at the Medical Society of London. It was taken from a boy aged eight, who died of scarlatina. It contained  $\frac{3}{4}$  of a pint of bile. The common duct was impervious. Mr. Yonge, in the *Philosophical Transactions*, N°. 333, mentions a case, where the gall-bladder and its contents weighed 10 lbs. 12 oz.; and Mr. Gibson, in the second volume of the *Edinburgh Medical Essays*, gives another instance, where this cavity is said to have contained 8 lbs. of bile. It is doubtful, however, whether these were not hydatid cysts? and I think it not unlikely, that the remarkable case I have related in my paper on *Melæna*, (case 5, *Lancet* 1846), was one of this description. I attended a girl aged eight, who had intense pain in the abdomen, and a soft swelling under the right lobe of the liver; after ten days she became insensible, and appeared to be dying, when about four quarts of dark pitchy matter were discharged per anum, and she gradually recovered.

For other examples of dilatation of the gall-bladder and its ducts, see Museum of the Edinburgh College of Surgeons, p. 1901. Guy's Museum, p. 1954; and London Hunterian Museum, ps. 204, 206. King's College Museum, ps. 247, 252, 253, 254, 262, 266, 260. St. Batholomew's Museum, ps. 5, 10. Dublin, Richmond Hospital Museum, p. B. 38. St. Thomas's Hospital Museum, p. 44, 46, 47. Morgagni, *Letter xxxvii.*, *Obs.* 14. Todd, *Dublin Hospital Reports*, vol. 1. Smith, *Dublin Journal* 1846. Petit, *Œuvres Chirurg.* vol. 2. p. 282. The most remarkable specimen of enlarged gall-bladder that I have seen, is in the Museum of St. Thomas's Hospital, p. 44. It would contain two quarts of fluid. It was mistaken for abscess and punctured.

*Contraction and thickening* of the gall-bladder in old subjects are not uncommon. I have shown two specimens of this kind at the Pathological Society of London. The first was taken from a patient æt. 84; the common duct was impervious, and the bladder was thickened and contracted upon two calculi. In the other case the patient was 56 years of age, and five years before his death, I supposed that he suffered from gall-stones. The common duct was impervious, and the bladder greatly thickened and contracted upon several calculi. *Transactions* 1846, and 1847, pages 38, 100. Vide Chatham Museum ps. 1512, 1513, 1514. Hunterian Museum, Glasgow, p. 51 S Edinburgh College of Surgeons, p. 1899. Guy's Museum, p. 1954 London Hunterian Museum, ps. 1441, 1442, 1455. King's College Museum, p. 246. Dublin, College of Surgeon's Museum, p. 971 St. Thomas's Hospital Museum, p. 59. Andral, *Clin. Méd.*, vol. 4 ps. 500, 507; and Bell, *Medical Gazette*, 1849.

*Idiopathic inflammation* of the gall-bladder I believe to be of very rare occurrence, but when the peritoneum is extensively inflamed from any cause, the serous surface of this cavity is likewise affected. I

duodenitis the inflammation may also extend along the ducts to the gall-bladder. A supposed case of idiopathic inflammation of the gall-bladder is published in the *Gazette des Hôpitaux* 1849, p. 392. Cruveilhier (*Anat. Path.*) says he has only seen two cases of inflammation of the gall-bladder, but Andral states (*Clin. Méd.*) that inflammatory alterations of texture are frequent. Rokitansky and some other writers have described catarrhal inflammation as existing in the mucous lining of the gall-bladder, but the evidence adduced of its existence appears to me to be very incomplete.

Inflammation from violence and from the presence of calculi is not unfrequently followed by ulceration into the stomach, duodenum, and colon, or through the abdominal parietes. Dr. Scott, in the 25th vol. of the *Edinburgh Medical and Surgical Journal*, relates a case of death from supposed inflammation of the gall-bladder, produced by a large calculus. Examples of these lesions may likewise be found in the Hunterian Museum, Glasgow, p. 47, g. s. 47, h. King's College Museum, p. 57. St. Bartholomew's Museum, p. 11. Dublin, Richmond Hospital Museum, p. B. 17. St. Thomas's Hospital Museum, ps. 55, 56. Peacock, *Transactions of the London Pathological Society*, 1848, p. 255. Mr. Ferrall, *Dublin Journal*, vol. 23. p. 170. *Rév. Méd.* 1834. I have not met with an instance in which a biliary calculus has escaped into the cavity of the peritoneum.

*Fistulous openings* through the abdominal integuments have frequently occurred, and calculi have been discharged by this means. Two large gall-stones are in the Guy's Museum (p. 1987.<sup>32</sup>) which passed through a fistulous opening at the umbilicus. But the most curious case of this kind that I know of was that of the Bishop of Chichester, who died at the age of ninety. Many years before his death, three biliary calculi were extracted from a fistulous opening at the navel, one weighed half an ounce and another two drachms. Hunterian Museum, p. A. 81. In the St. Thomas's Hospital Museum, preparation 75 shows an ulcer at the fundus of the gall-bladder, with two calculi impacted in it; between the peritoneum and the abdominal muscles, are seventy-five calculi, which are shut out from the gall-bladder. In the *Edinburgh Medical Journal*, 1849, two cases are mentioned by Klemm and Nobili. In one, caustic potash was used, in the other the scalpel to favor the exit of the stones. *Dublin Journal*, March, vol. 17. *Gazette Médicale de Paris*, 1842, p. 425. *Medical Times*, 1843. These ulcerations and fistulae may likewise be occasioned by external injury, and by spontaneous abscess: instances of the former are recorded by Gay, *Lancet*, 1850, and Huguier, *Medical Times*, 1846.

In November last I saw a portion of gall-bladder exhibited at the London Pathological Society, by Dr. O. Ward, which had been discharged through the abdominal parietes. About a pint of bile flowed from the wound daily, and an interesting fact was stated by Dr. Ward, that the quantity of bile was always increased by the administration of mercury. Mr. Coulson said, in a similar case which was under his care, he had observed the same result. These cases serve to verify the conclusions come to by Dr. Michea (*L'Union Médicale*, 1848), that mercury has a special action upon the liver. For other examples see Obré and Coley. *Transactions of the London Pathological Society*, 1848, p. 272.

The ducts may be obliterated by acute or chronic inflammation, and transformed into fibrous cords. Andral. *Clin. Méd. obs.* 48, 49, 50, 51. *Gazette des Hôpitaux*, 1843, p. 482, 568. St. Thomas's Hospital Museum, ps. 48, 59. Spasm of the ducts is also described by many authors, but there can be no positive evidence of its existence, although the intense pain often occasioned by the passage of a gall-stone appears to be of a spasmody character.

*Ossification.* Ossification of the gall-bladder has been occasionally met with, but it is very rare. Preparation 1515, Chatham Museum. *Baily's Morbid Anatomy*. London Hunterian Museum, p. 1443. Dr. S. S. Allison, *Medical Gazette*, vol. 35, and King's College Museum, p. 259.

Mr. Bagshaw, March, 1847, exhibited at the Bath Pathological Society an ossified gall-bladder, taken from a woman 70 years of age. The secretion of bile was not deficient, and there were no symptoms, except occasional bilious vomiting, that could be referred to this lesion. The ossific deposit was almost universal; a white pasty-looking matter, which contained 40 per cent. of cholesterine, was in the cavity. *Provincial Journal*, 1847.

*Malignant disease* is seldom confined to this part. When in Dublin, in 1848, I saw an interesting case at the Meath Hospital, under the care of my friend Dr. Lees. A man, 62 years of age, gradually sunk from diseased liver; this organ was hard, almost globular in form, and studded with hard tubercles of various sizes, but the gall-bladder presented a curious appearance, being entirely covered with these excrescences; the common duct was diminished in caliber by one of them, but it was not impervious. The inner surface of the gall-bladder was irregular. A few tubercles were present also in the omentum and right pleura. Dr. Burridge, in a woman at 42, who had a small hard tumor in the mamma, and a single carcinomatous tubercle in the liver; found a scirrhouss mass in the place of the gall-bladder, a part of the common duct only being visible. *Provincial Journal*, 1845. See also ps. 3, 4, 6, 13, St. Bartholomew's Museum; and ps. 242, 244, King's College Museum; and Cruveilhier, *Anat. Path. Liv.* 12.

In addition to the above lesions, there may be hypertrophy of the muscular coat of the gall-bladder. I saw a good example of this in a man at St. Thomas's Hospital, 1838, who had jaundice from enlarged pancreas. The gall-bladder was dilated, and the muscular coat thickened, in consequence, I suppose, of its increased efforts to expel the bile. In this case the teeth and arteries were of a bright yellow colour.

Anomalies of form may exist—membranous septa and bands (plate fig. 3.) divide its cavity, and pouches, project from its parietes. London Hunterian Museum, p. 1448. Guy's Museum, p. 1956. Melanosis may affect the gall-bladder (King's College Museum, p. 242); pus may be in its cavity, and sometimes calculi are found adherent to its parietes. Guy's Museum, p. 1963. London Hunterian Museum, ps 1444, 1446. St. Bartholomew's Museum, p. 5. Hydatids have been present in the cavity of this viscus, increasing its size to an enormous extent: extraneous bodies, such as pins, needles, globules of mercury and lumbrixi have found their way into the gall-bladder, and the first mentioned have formed the nuclei of gall-stones. *Boston Journal*, 1844.

Entozoa, peculiar to the liver and gall-bladder, are sometimes present, and intestinal worms may creep into the ducts. In the Chatham Museum, p. 1519, a *lumbricus* is seen in the hepatic ducts. See also *Dublin Medical Press*, 1851, p. 338.

*Wounds and Injuries.* All cases that I am acquainted with (with one exception) of rupture of the gall-bladder from violence, or from incisions or punctures made into it by cutting instruments so as to allow of the escape of the bile into the peritoneal cavity, have terminated fatally. In a case of rupture of this viscus mentioned by Dr. Machlachlen, the patient lived forty-eight hours.—*Lancet*, 1846, p. 603. In an instance recorded by M. Campaignac, of rupture of the hepatic duct, the man died eighteen days after, of general peritonitis.—*Journal, Hebd.* 1829.

From the position of the gall-bladder incised wounds are seldom made in it without the liver being injured at the same time. Dr. Stewart, *Philosophical Trans.* No. 414, mentions a soldier who lived five days after a wound of this viscus; and Sabatier (*Méd. Opérat.* t. 1, p. 34) says this is the only case he could find on record: he mentions another case under his own care, where the patient lived three days. Fryer (*Med. Chir. Trans.* vol. iv.) attended a boy who had rupture of the gall-bladder or its ducts from violence, and when about three weeks after the accident he appeared to be sinking, the abdomen was punctured, and thirteen pints of pure bile were removed—the operation was repeated three times; forty-eight pints of this fluid, in all, were discharged, and the patient cured. See also Campaignac (*Journal Hebd.* January 1829, and *St. Bartholomew's Museum*, p. 14.)

#### THE BILE, ITS NORMAL AND ABNORMAL CONDITIONS.

Although, since the time of Hippocrates, the condition of this fluid has been the theme for learned dissertations and pedantic discourses, how little do we really know at present respecting it? Many a man has made his fortune by poking his nose into a certain utensil, and commenting upon the *color* of its contents, without knowing or caring to know, how the bile was secreted, or what became of the enormous quantity daily poured into the duodenum, the *more abundant constituents* of which are not (as he supposed) found in the excrement. The patient, however, who was *always* bilious, was satisfied that Dr. Biline knew his complaint, and that his chylopoetic viscera were deranged. Then came antibilious pills before dinner, and after supper, to assist the sluggish liver and overloaded stomach, until, like the spirit of the dram-drinker, these stimulants were almost necessary to keep the jaded functions in action. The money received by the government of this country, during the present century for the duty on "Antibilious Pills" alone, would be sufficient to pay the national debt of some of the European States. How truly is England called the paradise of Quacks!

*Composition of healthy bile, and the quantity secreted.* According to the analysis of Berzelius in 1807, (*Traité de Chimie*) the bile is composed of water, 904.4. Biliary matter and fat, 80.0. Mucus, 3.0. Osmazome, Chloride of Sodium, and Lactate of Soda, 7.4. Soda 4.1. Phosphates and matters insoluble in Alcohol, 1.1. in 1000 parts.

Analyses have been since made by Thenard, Gmelin, Tiedemann,

Prout, Demarçay Leibig, Theyer, Schlosser, Kemp, Polli, Dumas, Redtenbacher, Mulder, Scherer, Platner, Freich Stroeeker, and Buchner. The subsequent analysis of Berzelius reveal bilin, cholepyrrhin and biliverdin, and others have added taurine, the choleic, choloидic, cholalic, cholic, and fellanic acids. Redtenbacher, in 1845, detected the presence of sulphur in taurine. Some of the above terms would puzzle learned philologists, and I fear they afford no indication of scientific progress in this department of animal chemistry.

*Quantity.* It is difficult to ascertain the exact quantity of this fluid secreted by an animal in a healthy state. In cases of fistulous openings, where the bile has been daily collected, it may be said that the liver is in an unnatural condition, and that its secretion may be more abundant. Taking the size of this organ into account, as well as the experiments that have been made by various physiologists, it is probable, I think, that the amount of the secretion has not been much overrated. L'Héretier mentions a case of biliary fistula, in which about sixteen ounces of bile escaped in twenty-four hours, and probably all the secretion did not pass through the fistulous opening. Haller estimated the quantity at 24 oz. in the twenty-four hours, in man. Burdach from 17 to 24 oz. Leibig 24 oz. In the horse, the quantity daily secreted, is supposed to amount to 36 lbs.; in the ox to  $37\frac{1}{2}$  lbs. and in the dog to 36 oz.

I scarcely need remind the medical practitioner that if 24 oz. of bile are secreted daily by the human subject, it cannot pass per anum; and therefore it must be employed for other purposes than the mere stimulation of the alimentary canal, or for the separation of the chyle. It is also certain that the bowels will act without the presence of the bile, as evidenced in Asiatic cholera, and in some cases of icterus, where the bile-ducts are impervious. A person may likewise be in good health without the evacuation of this fluid per anum. I attended a gentleman for several years, a hale old man, who was never well if his bowels were relieved more than once in seven days, and frequently the evacuation took place only once a fortnight. I could give many instances of this kind,

The opinion of Leibig, respecting the use of the bile, appears to me to be the most satisfactory one, viz. that the greater part of this fluid is burnt in the circulation, or in other words, it affords fuel for the respiratory apparatus.

The experiments made by various physiologists show that the bile is essential to life. Magendie tied the *ductus communis choleducus* in adult animals, but the greater number died from the operation; in those that survived for several days, the faeces were found without bile. Schwann tied the common duct in eighteen dogs, and made the bile flow through the abdominal integuments; ten died soon after the operation, six lived from seven to sixty-four days, and two recovered; the bile passage into the intestines having been restored. The first effect of the operation was emaciation, debility, and loss of hair. (Paget's Retrospect, 1845.) Other experiments have been made by M. Blondlot, (*Rév. Méd.* 1848) the results of which are opposed to those of Schwann, but they are not sufficiently numerous, I think, to demand attention. M. Blondlot comes to the conclusion that the bile is not necessary for digestion.

*Morbid conditions of the Bile.* In the whole range of our investigations there is not a more important subject than this, and probably there is not one so little understood. If chemists are undetermined respecting the healthy constituents of the bile, it is scarcely likely that they can have made much progress in the elucidation of its diseases; indeed I know of no series of well conducted analyses that can be referred to. The bile has been examined by many chemists, in isolated cases, but these analyses have led to no good result, and the chemistry of morbid bile has yet to be determined. How many diseases owe their origin to abnormal conditions of the liver?—the tuberculated lung—the scrofulous joint—the cancerous breast, and many other affections, for ought we know, may often be engendered by a deranged secretion of the bile. All who have been in the habit of examining the gall-bladder must have observed a marked difference both in the color and quantity of its contents. Sometimes the gall-bladder is greatly distended (as in cholera,) at other times this receptacle holds but little of the biliary secretion. The variations in the color and consistence of the bile are numerous—yellow, brown, dark brown, green brown, and a brownish white, being the most frequent. I have several times observed the bile of infants of the color and consistence of thin gruel.

The ancients attached much importance to the bile, and modern writers have followed their example; thus we have bilious temperaments, bilious fevers, bilious colics, bilious headaches, bilious complications, all denoting derangement of function in the hepatic secretion, but respecting the nature of these morbid changes we are as much in the dark as ever. Hippocrates, Galen, Theophilus, and many physicians of more recent date, have spoken much of black bile, but it is questionable whether the bile is ever secreted of a black color. This so-called black bile is nothing more than the exudation of blood from the biliary passages and mucous lining of the alimentary canal, and although stated by Hippocrates and others to be a fatal symptom, all practical physicians have witnessed many instances in which melanotic discharges have been attended with a salutary result. In the bilious fevers, described by most authors, (the Walcheren for example,) bile of various shades, yellow, dark green, or black, is supposed to have passed from the bowels, but whether these evacuations were bilious or otherwise, remains to be determined. The black vomit, supposed by many to consist of bile, is evidently either a secretion from the mucous glands, or decomposed blood. In the yellow fever large quantities of yellow and green bile appear to be discharged, but I am not acquainted with any conclusive evidence upon the subject. The writers on diseases of tropical climates all describe these fluxes of bile, and speak of various alterations of the secretion, such as insipidity, acridity, and viscosity, but they have not made such fecal examinations as to entitle their opinions to much weight. Dr. James Johnson, in his work on tropical climates, says, in speaking of hepatic derangements, "that after brisk doses of calomel and cathartic extract, the bilious evacuations have produced a sensation as if boiling lead were passing through the intestines;" and he speaks of the extraordinary influence that *excess* or *deficiency* of the biliary secretion has upon the mental functions.

I am willing to attach as much importance as any one, to the influence of hepatic disorders and diseases upon the animal economy, but I

am anxious to show that our present knowledge of bilious affections is rather *imaginary* than *real*, and that much hard labor and chemical research is needed, before we are justified in speaking positively on the subject. The first step towards progress, is to know our ignorance!

I will only briefly mention some of the analyses of morbid bile that have been recently instituted.

Andral, (*Clin Méd.*, vol. 3, p. 583,) says nothing is more variable than the condition of the bile, but it does not appear to differ more in continued fevers than in other diseases. According to Freich, in fatty, waxy, and granular degenerations of the liver, the watery constituents of the bile differ from 86 to 96 per cent, and the solid matter from 4 to 13 per cent. In typhus fever the water was increased, and the solid constituents diminished. In scrofula also, the analyses showed the same result. In a case of icterus, Scherer found a great increase of the coloring matter of the bile, but no cholesterine was present. In another case of jaundice, in which the bile was examined by Bizio, it contained fatty oil, stearin, and green resin. For further information upon this subject, I refer the reader to *Simon's Chemistry*, (*Day's translation*, p. 22, vol. 2.) where other analyses are given, but as I have said before, unless these investigations are conducted upon a large scale, they can be of little practical advantage. The work of Buisson, *De la Bile et ses variétés Physiologique*, 1843, and the Essay of Dr. Fauconneau-Dufresne, in the *Memoirs of the French Academy of Medicine*, 1848, may also be consulted.

I next come to a subject connected with morbid bile, which is better understood than any of the abnormal conditions of this fluid; viz., gall-stones; and I now republish the paper alluded to at the commencement of this essay.

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November 3rd, 1840, I was requested to visit Mrs. I. Walworth, ætat. 66. who for some weeks had been laboring under ascites, with anasarca of the lower extremities. She has been accustomed to good living, but has never indulged to excess; her circumstances of late have not been so good as formerly, and she has had much mental anxiety. About ten months since she had jaundice, and has been subject to what she calls "spasms of the stomach:" the skin has a yellowish tinge; the abdomen is very large, as well as the legs and thighs; the right leg is inflamed, and there is a constant oozing of serum from a small abraded surface; the urine not albuminous. I ordered a teacupful of broom tea three times daily, with two teaspoonfuls of gin, and the following pills:—R *Blue pill*. Di. *Powder of capsicum*, gr. vi. *Powder of squills*, gr. vi. *Powder of digitalis*, gr. iv. Make into ten pills, one to be taken twice a-day. After continuing the above plan for a few days, she passed large quantities of urine, and the abdomen and extremities gradually diminished in size. In three weeks all the water (probably four gallons) was removed, and she was able to walk about the house. I continued the mercury till the gums were affected, and slight mercurial action was kept up for many weeks. May 9, 1841. Is nearly in the same state as first described; abdomen, thighs, and legs, very large, serum oozing from the latter in large quantities; is unable to lie down in her bed; the skin yellowish, but not amounting

to jaundice; the pulse very irregular, and the breathing occasionally difficult: the same treatment was pursued as at first, with the effect of removing all the fluid from the abdomen and lower extremities by increasing the secretion of the kidneys. She died, however, June 2nd, apparently from exhaustion.

*Examination forty-eight hours after death*—Mr. Webber present. The external appearance of the body emaciated, with the skin of a yellowish tint. *Chest*.—The lungs healthy; pleuritic adhesion to a small extent; no fluid in the pleurae or pericardium; the heart rather larger than natural, and the left ventricle hypertrophied (about one-third more than its natural thickness;) the semilunar valves normal; the left auriculo-ventricular opening was surrounded by a bony ring, and the mitral valves appeared more cord-like than natural. *Abdomen*.—The omentum much thickened and of a dark color (liver-like appearance); small patches of organised lymph on various parts, but not of recent formation; the intestines were congested; the liver of its natural size and consistence, but of a yellowish white color; the gall-bladder distended with calculi (506,) varying in size from a wheat-kernel to a horse-bean; the kidneys were rather congested, but not granular; the brain not examined.

My chief object in bringing this case before the society, is to direct the attention of its members to the subject of gall-stones; but before doing so I will briefly allude to one of the remedies employed, viz., the broom tea, and gin. I think in dropsy not depending directly upon inflammatory action, this combination is one of the most valuable diuretics we possess; its influence upon the kidneys in this case was extraordinary, and although its action was probably increased by the pills, I am inclined to attribute the principal benefit to its use, having on many occasions seen its good effects when given alone. The number of stones in the gall-bladder is another feature of interest, and shows that these concretions may exist to a large extent without producing much inconvenience; pain had occasionally been experienced in the region of the stomach, but it was not of long duration. This may be explained probably by the rounded form of the calculi, which it will be seen are of the "mellitic" species.

The gall-stone upon the table was passed some years since by a lady whom I attended, after many hours of excruciating suffering; the skin was of a yellow tinge, but not amounting to jaundice. This is the largest calculus I have known to pass the common duct; its circumference in one part is nearly two inches. I am aware that biliary calculi of a much larger size have passed per anum, but these probably found their way into the intestines by ulceration; two interesting examples of which are recorded by Mr. Brayne in the 12th volume of the "*Medico-Chirurgical Transactions*."

Another preparation on the table was taken from an infant who died jaundiced under my care on the fifth day after its birth; the gall-bladder was empty, and at the commencement of the cystic duct was a small portion of hard, inspissated bile, as large as a pea, between which and the neck of the gall-bladder an opening existed which admitted the end of the blowpipe, and through which the bile had escaped, as the surrounding parts were tinged with this fluid; the hepatic duct was pervious, and the intestines were lined with a yellowish pulpy matter.

The number of gall-stones is sometimes greater than in the case I

have related. Morgagni (*De Sedibus et Causis Morborum,*) mentions an instance where 3,645 were taken from the gall-bladder. Dr. Parry in his work on "*Angina Pectoris,*" page 240, relates the case of a gentleman in whose gall-bladder 2,654 were found, weighing 438 grains troy; "they varied much in size, so that of the smallest upwards of forty were necessary to counterbalance one troy grain, and the largest weighed sixty-two grains and sixth-tenths." In the Hunterian Museum, Glasgow, are 1,074 taken from one gall-bladder. Examples are recorded of their having attained an enormous size. Mr. Blagden, in the fourth volume of the "*Medico-Chirurgical Transactions,*" mentions "an instance in which a stone which passed through the abdominal parietes weighed nine drachms."

Dr. Heberden, in the second volume of the same publication, says, "one was taken from the gall-bladder of Lord Bath which weighed two drachms." In Mr. Brayne's "first case the calculus weighed 228 grains; and in the second case, one stone weighed 176 grains, and the other 159 grains." Dr. Baillie (*Morbid anatomy*) met with a stone as large as a pullet's egg, occupying the whole of the fundus of the gall-bladder. Saye, in the "*Journal des Savans,*" relates an instance of one as large as a hen's egg. Heberden, in his "*Commentarii de Morborum Historiâ,*" speaks of one which escaped from a discharging tumour near the umbilicus; its weight, 245 grains.

I may here mention that substances occasionally pass from the bowels which are mistaken by the superficial observer for biliary calculi. I have known an instance where currant-seeds were thought to be gall-stones by the medical attendant. Dr. Marcet (*Calculus Disorders*) mentions "that woody knots, which are found in certain pears, cheesy concretions, and lobster spawn, have been mistaken by some for biliary products."

Whilst upon this subject, I cannot help digressing a little for the purpose of alluding to a laughable circumstance that occurred to me some years since. A friend of mine in the country had a phthisical patient under his care who vomited frequently a quantity of the substance contained in this bottle; it was evidently organised, and thought by some to be a nondescript animal; it was sent to London, and examined by many learned in physic. I believe the College of Physicians even could not determine its nature. I happened, however, to show it to Mr. J. Dalrymple, who at once pronounced it to be the generative organs of the snail. The mystery was now solved, the girl had swallowed snails, and these parts being hard and indigestible were rejected by the stomach.

On the table is some pure cholesterine passed in large quantities from the bowels of a patient under the care of Dr. Iliff; also a specimen of fatty matter, which was voided in great abundance from the bowels of a woman who consulted me a few years since.

The time of the society, I think, would not be profitably employed were I to enter into the chemical composition, symptoms, diagnosis, prognosis, &c., of these concretions, as they have been so fully described by various authors, and must be well known to all present. I will therefore conclude my paper by noticing only their causes and treatment.

That these calculi have their origin in a vitiated state of the bile, and that there is a change in its constituent parts, we have, I think, suffi-

cient proof; but what this condition is, has not been satisfactorily determined. Many suppose (and I think it the most probable supposition) that the abundance of fatty matter (cholesterine) in the bile is the chief cause of their formation; others believe that they arise from the absorption of the watery parts of this fluid, and some have attributed their origin to a putrescent condition. These are questions, however, which cannot be determined until the chemical composition of the bile is better understood, and it is therefore useless to proceed with this subject. Women are said by most writers to be more frequently affected with this complaint than men; and Dr. Stokes, of Dublin, in his lectures, calculates that five-sixths of the cases occur in females.

Amongst the causes, it is supposed "that those of a melancholic and bilious temperament are more liable to these formations, and especially those whose habits are sedentary, and who have much mental disquietude." "*The use of fermented drinks is also believed by most writers to be a very frequent cause.*" Unfortunately we have no statistical records which can be consulted; indeed, I know of no author who has published more than five or six cases, and these but imperfectly related. I have endeavored in the accompanying table formed, by selecting cases from private friends, the French and English journals, and the works of those who have written upon the subject, to supply this deficiency, and I hope the conclusions I have drawn are not devoid of interest. I have selected *those cases only where the calculi have been found*, and for this reason I reject those published by Durande. (about twenty,) which are of a doubtful character. (*Observ. du Mélange d' Ether Sulfurique.*)

Here follows a table of 112 cases of gall-stones, which those who are interested in the subject can refer to. In this table are included 40 cases by Dr. Heyfelder, who states that the inhabitants of the Dutchy in which he resides, eat pork and farinaceous aliments, and drink thick beer; of these patients 37 were females, and 3 males, an unusual proportion in favor of the former sex.

Of the 112 individuals included in the table, 84 were females, and 28 males. 8 were under 30 years of age; 68 between 30 and 60; 15 between 60 and 75, and one 81. The following deductions are drawn from these cases.

- 1st. That females are more liable to these affections than males: the proportion being as 3 to 1 (*exclusive* of Dr. Heyfelder's cases, 2 to 1).
- 2nd. That the greater number are persons of melancholic and bilious temperaments, and are in the middle and upper ranks of life.
- 3rd. That mental disquietude is a very frequent cause.
- 4th. That sedentary habits and good living (*especially eating*) also excite these maladies, and that they are most frequent between the ages of 30 and 60.
- 5th. That fat people are not (as most authors assert) more subject to gall-stones than those of spare habit.
- 6th. That the use of *fermented drinks* operates *but little* in the production of the complaint. This opinion is strengthened by the circumstance of gin-drinkers being, *I believe*, less liable to these affections; as well as the greater prevalence of gall-stones amongst females. In many of the cases, the habits of the patients are not mentioned; but only two are described as intemperate.
- 7th. That these calculi may exist, producing but little, if any, inconvenience; and in the majority of cases there is no apparent structural change in the liver or gall-bladder.

*Treatment.*—Little difference of opinion, I apprehend, can arise respecting the treatment during the passage of a gall-stone. Bleeding from the arm (in the robust and plethoric); sometimes the application of leeches; the warm bath; large doses of morphia combined with ipecacuanha, followed by purgatives and purgative enemata, are the principal. Emetics have been strongly recommended by some and condemned by others. My experience does not enable me to give an opinion. Bertin, however, speaks of cases of rupture of the gall-bladder produced by vomiting. The antim. potass. tart., taraxacum, ipecacuanha, &c., are also recommended. Brichtea relates many cases where the application of a bladder of ice over the region of the gall-bladder appeared to afford great relief.

Although all English practitioners are nearly agreed as to the treatment during the paroxysm, little appears to be known respecting the best mode of preventing the formation of these calculi; and it is to this question that I am particularly anxious to direct the society's attention. I make the query rather for the purpose of eliciting information than of imparting any. I will nevertheless briefly state the conclusions I have come to upon the subject. Believing that the chief causes are *mental exertion and anxiety, want of exercise and improper diet, producing impaired tone of stomach, and deficient assimilation,* I would endeavour to obviate these by a plain simple regimen, exercise in the open air, and the avoidance, if possible, of **MENTAL DISQUIETITUDE** and exertion. The administration of stomachic and alterative medicines may also be had recourse to. Cold and tepid sponging of the body, with the use of the flesh-brush, or hair-gloves, would probably have a beneficial influence by improving the functions of the skin.

Some have supposed that certain medicines have the power of dissolving these calculi, and amongst them I may mention soap, the fixed alkalies, infusion of dandelion, &c. But the remedy of most celebrity is that of Durande, consisting of two parts of spirits of turpentine, and three of sulphuric ether: of this about forty drops are given every morning for some weeks (as a dissolvent;) it is also administered during the passage of a gall-stone. Several continental writers, as well as Dr. Copland, speak favorably of this medicine. Durande, (*Memoirs de la Société Medicale d'Emulation*, vol. ix.) says he has seen gall-stones pass from the bowels of the consistence of pitch during its use. I have examined his cases, and I confess that they appear to me to be of an unsatisfactory description, and do not warrant the inferences he has drawn.

A curious circumstance, in connection with this subject, is mentioned by Glisson in his "*Anatomia Hepatis*" page 105, (published 1681:)—“Novi complures, qui lapidum hujusmodi fragmina ingenti quantitate per alvum elisserint: quorum locum genitalem haud aliud fuisse existinem, quam vasa bilaria, in quibus tubulus ejusmodi lapideus fortè natus, et frustillatim comminutus, per porum biliarium in intestina delabi, indeque per alvum excerni potuerit. In quam sententiam accedo libentius quòd videam boves hyberno tempore (quando fœno aut stramine pascuntur) lapideæ hujusmodi materiae plurimum congerere, adeò ut hepar eādem planè confertum reperiatur; verna autem tempestate (quam primum novo gramine vescuntur) eandem rarius inveniri. Solvuntur nempe, et exturbantur hi lapides à recentis graminis succo; quod, nisi per alvum, fieri nullo modo protest.”

I learn from an intelligent butcher in my neighbourhood that gall-stones are more frequently found in the stall-fed oxen, which come principally from Norfolk, Suffolk, Cambridgeshire, and Essex, (and are killed between February and June,) than in those from Lincolnshire and other counties, which are fattened upon grass. This statement requires further confirmation, but if true, the fact is interesting.

In conclusion, I repeat that my chief motive in bringing this paper before the society, has been to obtain information upon a subject which is at present, I think, but imperfectly understood.

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It will now be my object to add in a small compass, some of the information respecting gall-stones that I have since acquired. In corroboration of the fact mentioned by Glisson, I have learnt from the Duke of Richmond's shepherd, that prize sheep fed on oil-cake and dry food are very liable to these calculi, and in consequence, are sometimes affected with Jaundice.

In investigating the causes of these formations, the evidence above adduced respecting the lower animals, is I think very important; for in a vast majority of instances in the human subject, the presence of gall-stones may be traced to the same causes: want of exercise, and improper diet. I have not been able to meet with an example of this complaint in a hard-working, agricultural, laborer, of temperate habits. These formations occur generally at a time of life (between 40 and 60) when those whose means will allow of it, are too often disposed to take less bodily exertion, and to indulge more in the luxuries of the table. The subsidence of the menstrual function may be an additional reason for their occurrence in women at this period of life. I have met with two sisters who were affected with gall-stones, but the recorded cases of hereditary predisposition are very few.

*Climate.*—It is difficult to obtain any statistical information worth quoting respecting climate. From an examination of the museums of Scotland and Ireland, as well as the reports in the Medical Journals of these countries, I am led to believe that gall-stones are less common than in England; the difference in the beverage of the people probably accounting for the circumstance. In France and Germany they are very prevalent; but if I may judge from the periodicals of Italy and Spain, they are less frequent in the latter countries. On looking over the statistical reports of the Chinese medical missionaries, which extend over the last ten years, and include a great many thousand patients, I do not find one case of gall-stones. The American Journals contain but few examples, and the same remark will apply to the works on diseases of the East Indies. My friend, Dr. W. F. Daniell, who has been fourteen years on the Western Coast of Africa, tells me that he has never met with this complaint.

*Statistics.*—Since the table, quoted in my last paper, was compiled, I have from the British and Foreign Medical Journals; from the works of different authors, and especially from museums, collected, in addition to the 112 cases in the table, 154 examples of gall-stones: 93 of these individuals were females, and 61 males, making, it will be observed, a considerable difference between these, and the former statistics; but as many of the latter cases were collected from museums where preparations are more frequently taken from the bodies of men (soldiers and sailors,) I attach no importance to this

evidence, but I am inclined to think that my former estimate of three to one is about correct.

*Age.*—As regards age, there is very little difference in the two tables, but it should be recollect that gall-stones may exist for many years, and sometimes for the greater part of life, without producing any apparent inconvenience, especially when they attain such a size as to prevent their passing the common duct. In the last table there are eight persons under 30 years of age, and two of these had only reached their 24th year. Of those advanced in life, the oldest were 80, 90, and 98, showing that gall-stones do not *necessarily* shorten existence; and as I have said before, one means nature takes to render them innocuous is to close the cystic duct, and shut them out from the biliary canals. I believe it will be found, in nearly all cases of the escape of gall-stones through the abdominal integuments, that such a change has taken place. But although these calculi are not generally attended with fatal consequences, there are numerous cases on record in which they have produced death. Thus they may excite such a degree of inflammation and ulceration as to allow of their escape into the neighbouring cavities, and they have not unfrequently, by blocking up some part of the alimentary canal, occasioned fatal obstruction; general peritonitis may be produced by them, and when impacted in the ducts, the pain alone, in some instances, has been so severe as to kill the patient. In the King's College Museum, prep. 266, is a gall-bladder, full of calculi, from a lady 60 years of age, who sunk from excessive spasmotic pain.—Dr. Hooper's *Collection*, p. 610. Probably there is no pain more severe than that occasioned by the passage of a gall-stone. I recollect once seeing a surgeon writhing in the greatest agony from this cause, who called for a scalpel that he might open his side.

*Composition.*—As might be expected, the analyses of these calculi have not afforded the same results to all chemists; the quantity of cholesterine, biliary resin, and colouring matter, varying in different specimens, as the investigations of Brande, Glaube, Vogel, Schmidt, and others show. In the London Hunterian Museum there are 156 specimens of biliary calculi, and according to the analysis of Mr Taylor, I find that 133 were composed chiefly of cholesterine; 8 principally of the colouring matter of the bile; 12 of substances allied to the colouring matter of the bile; 2 of carbonate of lime, and 1 of the stearate and oleate of lime.

*Symptoms and Diagnosis.*—In addition to the signs before mentioned, I may allude to the peculiar appearance of the skin of those affected with gall-stones: it is often of a brownish, greasy appearance, with a darker shade under the eyes. I have two women now under my care affected with gall-stones, whose skins present this aspect. One of them æt. 51, a patient at the Metropolitan Dispensary; a few months since, after suffering excruciating pain in the epigastric region for four days, and having previously been affected with pain in the right shoulder, passed a gall-stone per anum as large as a hazel nut. The other patient, who is 40 years of age, has been afflicted for many years with this complaint. Gall-stones are often suspected to have passed the ducts, and yet they are not found in the evacuations. This arises probably from the imperfect manner in which the examinations are generally performed. The best means I know of, is to add water to the faeces, and filter through coarse canvas.

In 1846, I saw a young lady of melancholy temperament, æt. 25, whose mother had been affected with gall-stones, and who was labouring under sudden and acute pain in the epigastric region, with anxious countenance, cold skin, and feeble pulse. The pain subsided after two or three days; the warm bath, opium, and rubefacients having been employed. The age of the patient rendered the existence of gall-stones improbable, but taking into account the hereditary predisposition, as well as the symptoms, I am disposed to think that she suffered from this complaint, although no calculus was found. In 1837, I attended a gentleman, æt. 71, who laboured under jaundice for several weeks, occasioned, I supposed, by obstruction of the common duct, by a gall-stone; the sudden subsidence of the jaundice having strengthened this opinion. He was a strong active man, and a few years after this attack, he passed frequently small lithic acid calculi with his urine. He died in 1848, at the age of 82; and Mr. C. Taylor, of Camberwell, who examined the body, tells me "that the gall-bladder was free from stones, but the urinary bladder and prostate, contained from 90 to 100 calculi, varying in size from that of a large bean to a millet-seed." Some authors believe that urinary calculi, and biliary concretions, often exist together, but I can discover no conclusive evidence of this. The supposition respecting the greater frequency of these concretions in malignant diseases of the liver, I believe (judging from a large number of cases) is equally erroneous. It is singular too, that they do not appear to be connected with a fatty condition of the liver.

The diagnosis of biliary calculi, even when they are passing the ducts, is sometimes extremely difficult, but if the non-acceleration of the pulse (in many cases) the previous pain in the shoulder, the sudden invasion of the epigastric pain, the appearance of the skin, the habits, the age, and sex of the patient are taken into account, the diagnosis will be greatly facilitated. M. Fauconneau-Dufresne (before cited) says that biliary calculi in the bladder may often be detected by external examination; and M. Martin-Solon, (*L'Union Méd. Nov. 1849,*) in a case of gall-stones, could feel a distinct crepitus with the fingers; and I believe in the following remarkable case which I examined with my friend Mr. Dalby, of Blackman-street, in March, 1847, they might easily have been diagnosed by external examination, but although the lady had seen several celebrated London physicians, gall-stones were not suspected.

Miss — æt. 42, had suffered for several years, from anomalous symptoms of various kinds, which were supposed generally by those who saw her, to depend upon stomach and hepatic disorder or disease. For ten or eleven years she had frequent pain in the right shoulder and epigastric region, but it was never severe. She had a yellowish, sallow complexion, but had not been jaundiced, and she died, apparently worn out by the dyspeptic affection. We found the stomach large and flabby; its mucous lining near the cardiac orifice, being ecchymosed and pulpy. The lungs, heart, and other viscera, healthy, not excepting the liver. The gall-bladder was very large, and flaccid, and it contained 74 pearl-like calculi of a quadrangular shape; the largest as big as a common sized nut, (see plate fig. 5) and the smallest the size of a horse-bean. The whole weighed *an ounce and a half*, and are composed chiefly of cholesterine. The flat sides of many of them, were so united, as to form a compact body.

Figure No. 2. in the plate, represents a gall-bladder in my museum from a woman æt. 60, who died of jaundice and ascites; there were a great many calculi in the gall-bladder, which was distended with an albuminous fluid, probably its own secretion. The calculi, figures 1 and 4, are also in my museum. The first weighs 225 grains, and the liver in this case was granular and dense. Figure 4. represents a gall-stone weighing 203 grains, taken from a fat woman æt. 72, who had generally enjoyed good health; but six months before her death she had vomiting, and pain in the region of the gall-bladder, and was intensely jaundiced. From the immense size of the common duct, it was supposed that a large calculus had passed into the duodenum. These preparations were in the museum of the late Mr. Langstaff, Nos. 1231, 1233, and 1240 in the printed Catalogue. Figure 3. is a gall-bladder I took from an old gentleman; the cystic duct was obliterated, and the calculi divided by membranous septa.

*Treatment.*—As regards the treatment during a paroxysm of pain, I have nothing to add to my former statement, except that I think that the inhalation of chloroform might be used with advantage. I am not, however, acquainted with any case in which it has been tried. The remedy of Durande, before spoken of, I have only employed twice: in one instance the hepatic symptoms appeared to be relieved by it, but no calculi were found. The other case is now under treatment. Dr. Duparque (*Rév. Méd.* 1844, vol. 1.) states in five cases of gall-stones, he administered a mixture of  $\frac{3}{2}$ ii. of Castor Oil, and  $\frac{3}{4}$ i. of Sulphuric Ether, a tablespoonful to be taken every half-hour. In four cases, calculi were expelled under the influence of the remedy; in the fifth case no effect was produced by it. Martin-Solon (*L'Union Médicale*, 1849, p. 543.) gave a man 24 years of age, in whom he had detected calculi by the touch, ten scruples of Oil of Turpentine, and five of Sulphuric Ether, in dandalion *Tisane*, and five calculi passed; the detritus of calculi was also found in the excrement; after this, no crepitus nor fulness could be felt over the gall-bladder. It is difficult to understand how this, or any other medicine can effect such an immediate influence on the contents of the gall-bladder, and the expulsion of these stones may have been coincidences only.

When a calculus has attained a large size, there is no chance of reducing it, or of effecting its expulsion by solvent medicines (so called,) and it must be borne in mind, that the gall-bladder after a certain age, when it contains gall-stones, is so altered in size and structure, as to have lost its contractile power, and that if the magnitude of the stone could be diminished, it would only add to the danger of the patient.

I think that by great attention to diet, and exercise, the formation of these concretions may be prevented, and when present, if not of large size, they may be got rid of. A diet consisting chiefly of vegetable matter and fruits, with the avoidance of malt beverage, are the chief prophylactic means. It is difficult to persuade patients who have been accustomed to good living to adopt this regimen, but if fully carried out, I believe it will generally be found beneficial. Stomach and liver complications may exist, which will require a different treatment; but I speak of those cases of gall-stones which appear to depend chiefly upon a sluggish liver, and stagnant and fatty bile.